

WHAT IS CLAIMED IS:

- 1           1.       A data stream control system connectable to a storage device, the data  
2 stream control system selectively storing a series of selected data packets from an  
3 incoming data transport stream, the data stream control system comprising:  
4               a transport stream input interface that receives the incoming data  
5 transport stream comprising selected data packets having interpacket time  
6 intervals between the selected data packets;  
7               a command interface that receives at least one packet filter parameter  
8 identifying the series of selected data packets;  
9               a programmable data packet filter coupled to the command interface and  
10 transport stream input interface, the programmable data packet filter transmitting  
11 the series of selected data packets in response to the packet filter parameter and  
12 the incoming data transport stream;  
13               a storage interface coupled to the programmable data packet filter and  
14 connectable to the storage device, the storage interface transmitting the selected  
15 data packets to the storage device; and  
16               a counter that provides counter values for the selected data packets, each  
17 counter value representing a time of reception of a respective selected data  
18 packet, whereby the counter value is stored in association with the respective  
19 selected data packet to preserve information regarding the interpacket time  
20 intervals of the series of selected data packets from the incoming data transport  
21 stream.
- 1           2.       The data stream control system of Claim 1, wherein the counter is  
2 synchronized to a clock that provides time information.
- 1           3.       The data stream control system of Claim 1, wherein the counter value for  
2 the respective selected data packet corresponds to a time interval between the time of  
3 reception of the respective selected data packet and a first reference time.
- 1           4.       The data stream control system of Claim 3, wherein the first reference  
2 time represents a time of reception of an earlier selected data packet.



1           5.       The data stream control system of Claim 1, wherein the time of reception  
2 of a respective selected data packet is a time at which the respective selected data packet  
3 is received by the programmable data packet filter.

1           6.       The data stream control system of Claim 1, wherein the counter is  
2 coupled to the programmable data packet filter which detects selected and non-selected  
3 data packets, and the counter value represents an ordinal number of the respective  
4 selected data packet in the incoming data transport stream.

1           7.       The data stream control system of Claim 1, wherein the counter is  
2 coupled to the programmable data packet filter which detects selected and non-selected  
3 data packets, and the counter value represents a number of non-selected data packets  
4 interposed between the respective selected data packet and a previously received  
5 selected data packet.

1           8.       The data stream control system of Claim 1, wherein the counter value is  
2 appended to the respective selected data packet and stored on the storage device.

1           9.       The data stream control system of Claim 1, wherein the counter value is  
2 stored at a memory location of a memory buffer, wherein the memory location for the  
3 counter value is indexed to the respective selected data packet.

1           10.      The data stream control system of Claim 1, wherein the storage interface  
2 receives stored selected data packets from the storage device, the storage device playing  
3 back and transmitting the stored series of selected data packets, the data stream control  
4 system further comprising:

5                   a timing restorer that receives the stored selected data packets from the  
6 storage interface and that receives the counter value stored in association with  
7 the respective selected data packets, the timing restorer transmitting the stored  
8 selected data packet at a time of transmission responsive to the respective  
9 counter value; and

10                  a transport stream output interface coupled to the timing restorer and an  
11 outgoing data transport stream, whereby the transport stream output interface  
12 receives the stored series of selected data packets from the timing restorer and  
13 transmits the stored series of selected data packets to the outgoing data transport  
14 stream, the stored series of selected data packets having interpacket time



15 intervals which substantially match the corresponding interpacket time intervals  
16 of the series of selected data packets from the incoming data transport stream.

1 11. The data stream control system of Claim 10, wherein the timing restorer  
2 is synchronized to a clock that provides time information.

1 12. The data stream control system of Claim 11, wherein the counter is  
2 synchronized to the clock.

1 13. The data stream control system of Claim 10, wherein the time of  
2 transmission is referenced from a second reference time.

1 14. The data stream control system of Claim 13, wherein the second  
2 reference time represents a time of transmission of an earlier stored selected data packet.

1 15. The data stream control system of Claim 10, wherein the timing restorer  
2 interposes a number of null data packets between the stored selected data packet and a  
3 previously transmitted stored selected data packet, the number of interposed null data  
4 packets being responsive to the respective counter value of the stored selected data  
5 packet.

1 16. The data stream control system of Claim 1, wherein the selected data  
2 packets from the incoming data transport stream are encoded according to a selected  
3 compression standard.

1 17. The data stream control system of Claim 16, wherein the selected  
2 compression standard is an MPEG compression standard.

1 18. The data stream control system of Claim 1, wherein the selected data  
2 packet comprises a header with packet identification information.

1 19. The data stream control system of Claim 1, wherein the storage device  
2 comprises an IDE hard disk drive.

1 20. The data stream control system of Claim 1, wherein the interpacket time  
2 interval is defined as a time interval between a first time of reception of a first sync  
3 reference of a first selected data packet and a second time of reception of a second sync  
4 reference of a second selected data packet.

1 21. The data stream control system of Claim 1, wherein the interpacket time  
2 interval is defined by a number of non-selected data packets interposed between a first  
3 selected data packet and a second selected data packet.



1           22.     A data storage system that selectively stores a series of selected data  
2 packets from an incoming data transport stream and that plays back and transmits the  
3 stored series of selected data packets to an outgoing data transport stream, the data  
4 storage system comprising:  
5                 a data storage system controller that generates at least one packet filter  
6 parameter in response to user input, the at least one packet filter parameter  
7 identifying the series of selected data packets;  
8                 a transport stream input interface that receives the incoming data  
9 transport stream comprising selected data packets having interpacket time  
10 intervals between the selected data packets;  
11                 a command interface that receives the at least one packet filter parameter  
12 from the data storage system controller;  
13                 a programmable data packet filter coupled to the command interface and  
14 transport stream input interface, the programmable data packet filter transmitting  
15 the series of selected data packets in response to the packet filter parameter and  
16 the incoming data transport stream;  
17                 a storage device that stores the selected data packets;  
18                 a storage interface coupled to the programmable data packet filter and to  
19 the storage device, the storage interface transmitting the selected data packets to  
20 the storage device and receiving stored selected data packets from the storage  
21 device;  
22                 a counter that provides counter values for the selected data packets, each  
23 counter value representing a time of reception of a respective selected data  
24 packet, whereby the counter value is stored in association with the respective  
25 selected data packet to preserve information regarding the interpacket time  
26 intervals of the series of selected data packets from the incoming data transport  
27 stream;  
28                 a timing restorer that receives the stored selected data packets from the  
29 storage interface and that receives the counter values stored in association with  
30 the respective selected data packets, the timing restorer transmitting the stored



31 selected data packet at a time of transmission responsive to the respective  
32 counter value; and

33 a transport stream output interface coupled to the timing restorer and the  
34 outgoing data transport stream, whereby the transport stream output interface  
35 receives the stored series of selected data packets from the timing restorer, and  
36 the outgoing data transport stream receives the stored series of selected data  
37 packets from the transport stream output interface with interpacket time intervals  
38 which substantially match the corresponding interpacket time intervals of the  
39 series of selected data packets from the incoming data transport stream.

1 23. The data storage system of Claim 22, wherein the counter value for the  
2 respective selected data packet corresponds to a time interval between the time of  
3 reception of the respective selected data packet and a first reference time.

1 24. The data storage system of Claim 23, wherein the first reference time  
2 represents a time of reception of an earlier selected data packet.

1 25. The data storage system of Claim 22, wherein the time of reception of a  
2 respective selected data packet is a time at which the respective selected data packet is  
3 received by the programmable data packet filter.

1 26. The data storage system of Claim 22, wherein the counter is coupled to  
2 the programmable data packet filter which detects selected and non-selected data  
3 packets, and the counter value represents an ordinal number of the respective selected  
4 data packet in the incoming data transport stream.

1 27. The data storage system of Claim 22, wherein the counter is coupled to  
2 the programmable data packet filter which detects selected and non-selected data  
3 packets, and the counter value represents a number of non-selected data packets  
4 interposed between the respective selected data packet and a previously received  
5 selected data packet.

1 28. The data storage system of Claim 22, wherein the counter value is  
2 appended to the respective selected data packet and stored on the storage device.

1 29. The data storage system of Claim 22, wherein the counter value is stored  
2 at a memory location of a memory buffer, wherein the memory location for the counter  
3 value is indexed to the respective selected data packet.



1           30.     The data storage system of Claim 22, wherein the timing restorer is  
2     synchronized to a clock that provides time information.

1           31.     The data storage system of Claim 30, wherein the counter is synchronized  
2     to the clock.

1           32.     The data storage system of Claim 22, wherein the time of transmission is  
2     referenced from a second reference time.

1           33.     The data storage system of Claim 32, wherein the second reference time  
2     represents a time of transmission of an earlier stored selected data packet.

1           34.     The data storage system of Claim 22, wherein the timing restorer  
2     interposes a number of null data packets between the stored selected data packet and a  
3     previously transmitted stored selected data packet, the number of interposed null data  
4     packets being responsive to the respective counter value of the stored selected data  
5     packet.

1           35.     The data storage system of Claim 22, wherein the selected data packets  
2     from the incoming data transport stream are encoded according to a selected  
3     compression standard.

1           36.     The data storage system of Claim 35, wherein the selected compression  
2     standard is an MPEG compression standard.

1           37.     The data storage system of Claim 22, wherein the selected data packet  
2     comprises a header with packet identification information.

1           38.     The data storage system of Claim 22, wherein the storage device  
2     comprises an IDE hard disk drive.

1           39.     The data storage system of Claim 22, wherein an interpacket time interval  
2     is defined as a time interval between a first time of reception of a first sync reference of a  
3     first selected data packet and a second time of reception of a second sync reference of a  
4     second selected data packet.

1           40.     The data storage system of Claim 22, wherein an interpacket time interval  
2     is defined by a number of non-selected data packets interposed between a first selected  
3     data packet and a second selected data packet.



1           41.     A method of selectively storing a series of selected data packets from an  
2 incoming data transport stream, the series of selected data packets having interpacket  
3 time intervals between the selected data packets, the method comprising:  
4                 receiving at least one packet filter parameter identifying the series of  
5 selected data packets;  
6                 receiving the incoming data transport stream;  
7                 storing the series of selected data packets in response to the packet filter  
8 parameter and the incoming data transport stream;  
9                 providing counter values for the selected data packets, each counter value  
10 representing a time of reception of a respective selected data packet; and  
11                 storing the counter value in association with the respective selected data  
12 packet, thereby preserving information regarding the interpacket time intervals of  
13 the series of selected data packets from the incoming data transport stream.

1           42.     The method of Claim 41, wherein the counter value for the respective  
2 selected data packet corresponds to a time interval between the time of reception of the  
3 respective selected data packet and a first reference time.

1           43.     The method of Claim 42, wherein the first reference time represents a  
2 time of reception of an earlier selected data packet.

1           44.     The method of Claim 41, wherein the time of reception of a respective  
2 selected data packet is a time at which the respective selected data packet is received by  
3 the programmable data packet filter.

1           45.     The method of Claim 41, wherein the method further comprises  
2 calculating the counter value by counting a number of selected and non-selected data  
3 packets preceding the respective selected data packet.

1           46.     The method of Claim 41, wherein the method further comprises  
2 calculating the counter value by counting a number of non-selected data packets  
3 interposed between the respective selected data packet and a previously received  
4 selected data packet.

1           47.     The method of Claim 41, wherein storing the counter value comprises  
2 appending the counter value to the respective selected data packet and storing the  
3 counter value and the selected data packet on the storage device.



- 1           48.     The method of Claim 41, wherein storing the counter value comprises
- 2     storing the counter value at a memory location of a memory buffer, wherein the memory
- 3     location for the counter value is indexed to the respective selected data packet.

48. The method of Claim 41, wherein storing the counter value comprises  
storing the counter value at a memory location of a memory buffer, wherein the memory  
location for the counter value is indexed to the respective selected data packet.



1           49.    A method of selectively storing and playing back a series of selected data  
2 packets from an incoming data transport stream, the series of selected data packets  
3 having interpacket time intervals between the selected data packets, the method  
4 comprising:  
5                receiving at least one packet filter parameter identifying the series of  
6 selected data packets;  
7                receiving the incoming data transport stream;  
8                storing the series of selected data packets in response to the packet filter  
9 parameter and the incoming data transport stream;  
10              providing counter values for the selected data packets, each counter value  
11 representing a time of reception of a respective selected data packet;  
12              storing the counter value in association with the respective selected data  
13 packet, thereby preserving information regarding the interpacket time intervals of  
14 the series of selected data packets from the incoming data transport stream;  
15              playing back the stored selected data packets;  
16              receiving the counter value stored in association with the respective  
17 selected data packets; and  
18              transmitting the stored selected data packet at a time of transmission  
19 responsive to the respective counter value, whereby the stored series of selected  
20 data packets are transmitted with interpacket time intervals which substantially  
21 match the corresponding interpacket time intervals of the series of selected data  
22 packets from the incoming data transport stream.

1           50.    The method of Claim 49, wherein the counter value for the respective  
2 selected data packet corresponds to a time interval between the time of reception of the  
3 respective selected data packet and a first reference time.

1           51.    The method of Claim 50, wherein the first reference time represents a  
2 time of reception of an earlier selected data packet.

1           52.    The method of Claim 49, wherein the time of reception of a respective  
2 selected data packet is a time at which the respective selected data packet is received by  
3 the programmable data packet filter.



1           53.     The method of Claim 49, wherein the method further comprises  
2     calculating the counter value by counting a number of selected and non-selected data  
3     packets preceding the respective selected data packet.

1           54.     The method of Claim 49, wherein the method further comprises  
2     calculating the counter value by counting a number of non-selected data packets  
3     interposed between the respective selected data packet and a previously received  
4     selected data packet.

1           55.     The method of Claim 49, wherein the time of transmission is referenced  
2     from a second reference time.

1           56.     The method of Claim 55, wherein the second reference time represents a  
2     time of transmission of an earlier stored selected data packet.

1           57.     The method of Claim 49, wherein the selected data packets from the  
2     incoming data transport stream are encoded according to a selected compression  
3     standard.

1           58.     The method of Claim 57, wherein the selected compression standard is an  
2     MPEG compression standard.

1           59.     The method of Claim 49, wherein the selected data packet comprises a  
2     header with packet identification information.

1           60.     The method of Claim 49, wherein the selected data packets are stored on  
2     a storage device comprising an IDE hard disk drive.

1           61.     The method of Claim 60, wherein storing the counter value comprises  
2     appending the counter value to the respective selected data packet and storing the  
3     counter value with the selected data packet on the storage device.

1           62.     The method of Claim 49, wherein storing the counter value comprises  
2     storing the counter value at a memory location of a memory buffer, wherein the memory  
3     location for the counter value is indexed to the respective selected data packet.

1           63.     The method of Claim 49, wherein an interpacket time interval is defined  
2     as a time interval between a first time of reception of a first sync reference of a first  
3     selected data packet and a second time of reception of a second sync reference of a  
4     second selected data packet.



- 1           64.     The method of Claim 49, wherein an interpacket time interval is defined
- 2     by a number of non-selected data packets interposed between a first selected data packet
- 3     and a second selected data packet.

64. The method of Claim 49, wherein an interpacket time interval is defined by a number of non-selected data packets interposed between a first selected data packet and a second selected data packet.